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ABSTRACT

A study was undertaken to discover whether there were differences between disabled children's linguistic cue use and that of normal readers under controlled conditions. Fifty-one children, 22 learning disabled and 29 control, were drawn from a poor, inner-city school district; 28 children, 14 in each group, from an affluent, suburban area. After they had proceeded through a three-step procedure designed to control for error rate, the subjects read a version of a story written on eight levels of difficulty. Despite the attempt to control for error rate, there was a tendency for the learning disabled group to have a higher error rate than the control group. As a result, subsequent analyses involved tests of difference on the number and on the proportion of each of the oral reading variables. The findings showed that learning disabled students made proportionally more errors that marred sentence meaning and did not self-correct the serious meaning change errors as much as did the control group. By contrast, they used phonic cues as well as did the control group. The actual number of self-corrections was the same for the two groups; however, the learning disabled simply self-corrected less effectively. (Author)

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ORAL READING IN THE LEARNING DISABLED

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Beginning in the late 1960's, Kenneth Goodman and his colleagues conducted a number of investigations of oral reading behaviors. They analyzed text deviations, or miscues, in terms of the context of their occurrence, and, by so doing, initiated new interest in the linguistic properties of reading cues. Specifically, the linguistic context, both semantic and syntactic, the use of phonemic cues evident from use of sound/symbol relationships, and the degree of deviation from text context and graphic information for each miscue was noted in a series of studies. In two such reports (K.S. Goodman & Burke, 1973; Y. Goodman & Burke, 1972), investigators found that poor readers differed from good ones in two respects: (1) poor readers made more use of grapho-phonemic information than good readers, and (2) poor readers made less use of contextual cues than good readers.

Before these findings are directly related to instructional changes, as urged by writers of a series of papers (Allen and Watson, 1976), however, it is important to examine the basis of the recommendations. And there are internal problems with the reports; for example, although there is evidence in other reports that proportions of linguistic cue use change with the level of difficulty (Williamson and Young, 1975; Otto, 1977), in the K.S. Goodman and Burke and the Y. Goodman studies there was no control for difficulty level of the material and for reader proficiency. Other studies of oral reading which have controlled for material difficulty and reader proficiency level have not consistently replicated the Goodman findings. Although Hu-Pei-Au (1977) found differences between good and poor third graders like those reported in the Goodman reports, Coomber (1972) found no differences between good and poor readers in use of context.

Learning disabled children have been found to suffer from linguistic difficulties (Wiig and Semel, 1976; Bryan and Pflaum, 1979), both in test situations and in spontaneous speech with peers. Learning disabled children who were also reading disabled had lower performance on a language test than children who were not actually reading disabled but who were identified as learning disabled by their school (Newcomer and Magee, 1977). Evidence of difficulties in processing language among the learning disabled, especially those who had reading deficits, led to the speculation that there might be specific reading behaviors that were depressed in learning disabled children -- behaviors which relied on the linguistic cues of context. The present investigation was designed to examine the oral reading behaviors of learning disabled subjects reading at an error rate corresponding to very challenging classroom reading. The procedures for control of error rate were stringent; the content and length of the reading material were controlled.

The research questions asked (1) if learning disabled children would make less use of context cues than control readers; that is, it was asked if they would make more meaning change errors, (2) if learning disabled children would self-correct as much as control readers, (3) if disabled readers would self-correct their errors that changed sentence meaning as much as control readers. This question was asked because Weber (1970) had found that the poor first grade readers she studied self-corrected as much as the good readers; however, for the severe errors only, the errors that needed it the most, they did not self-correct as many errors. Measurement of correction of severe errors was thought to be of special importance because self-correction of

these errors requires the integration of different cues, of phonic cues, of knowledge of context, and of the need to maintain meaning. A corollary question, (4) asked if learning disabled children would make more multiple attempts to self-correct. And (5) asked if learning disabled subjects used phonic cues more in their errors than control readers. Finally, because previous research with learning disabled children has been conducted with middle class pupils, for the most part because special education services have not, until recently, been generally available in schools with impoverished children, question (6) asked if learning disabled subjects from two very different socio-economic backgrounds differ in their use of cue systems in oral reading.

Method

Subjects

Subjects were drawn from a poor, inner-city district (District A) and from an affluent, suburban district (District B). From four schools in District A, 22 subjects identified by the schools as learning disabled who were of normal intelligence (WISC scores) and 29 randomly selected subjects of similar age and sex participated in the study. (Seven learning disabled subjects had to be eliminated because of their inability to read the simplest level material). The ages of the included subjects ranged from 8-6 to 12-4 with a mean age of 10-9. All subjects were black; all came from school communities marked by poverty where a high proportion of children were eligible for free lunches. The current composite reading

achievement mean score (ITBS, 1973) for the control group was 4.821 grade equivalent (sd=1.251); for the control group it was 2.52 (sd=1.019). A t test of the difference indicated that the control group readers were, indeed, significantly better readers than the learning disabled group ($t=6.537$, $df=49$, $p < .01$).

From the all white, affluent suburban district B, 14 school identified learning disabled subjects of normal intelligence and 14 randomly selected (same age and sex) control subjects participated. The ages of these subjects ranged from 7-6 to 12-3 with a mean of 10-6. The current composite reading achievement scores for these groups (CTBS, 1968) were: control group, 6.093 (sd=3.256) and the learning disabilities group, 4.964 (sd=1.254). These scores were not significantly different ($t=1.202$, $df=26$).

Materials and Procedures

A story of 343 words was written and rewritten into eight versions corresponding in readability from grade 1 level through grades 9 or 10 (Spache, 1953; Dale and Chall, 1948). The final versions ranged in length from 337 to 348 words. There were small differences, too, in the number of idea units expressed.

For the first part of a three-step procedure designed to control error rate, words lists were generated from the story versions by selecting, starting with level 1, every fifth word until 20 different words were selected. At each succeeding level version, 20 new words were listed. The lists were verified as to difficulty with the Dale list of 769 words (Spache, 1953), the Dale list of 3,000 words (Dale and Chall, 1948), and the Dale-O'Rourke list (1976) and were found to represent appropriate grade level difficulty.

The three step method which was used to control error rate entailed, first, that subjects read each word list until they reached the list where three errors occurred. They then read a short, 25 word, beginning of the story at that level. According to the number of errors, adjustments were made to the assigned level, and subjects then read the next short part of the story. Finally adjustments when needed were made again, and subjects were assigned the final approximately 300 word remainder of the story.

Scoring and Coding

Experimenters scored all text deviations, or miscues, as they occurred during the actual reading. These were verified later from an audio tape on a machine which could be slowed for accurate hearing. Three experimenters who collected the data had agreement levels of 91.9 percent agreement for noting when miscues occurred and 85.5 percent agreement on marking miscues the same.

All scored miscues were then coded by a system which, in brief, noted whether an error was a first word of sentence error; whether it caused a meaning change to the sentence; if it did cause a meaning change, whether it resulted in an ungrammatical sentence or not; whether the error had been self-corrected; how many attempts to self-correct were made; and which of three levels of phonic cue use was evident. Mean inter-experimenter agreements of four experimenters were as follows: determination of meaning change errors, 89.68 percent; determination of grammaticality of the meaning change errors, 82.7 percent; determination of corrections, 100 percent; determination of level of phonic cue use, 85.1 percent.

Results

The findings result from a series of multivariate analyses of variance and are presented in Table 1. In order for a specific reading behavior to be considered a valid indicator of difference, the particular reading behavior had to be significant in both a test of difference in raw number and in a test using the subject error number proportional to the total number of miscues.

- Table 1 here -

Learning disabled subjects made significantly more miscues than control subjects (LD, $\bar{x}$=15.339, sd=5.452; C, $\bar{x}$=8.795, sd=3.876). Miscues included errors, self-corrections, and instances of soundings out of difficult words, such as "p...pa...painted", that ultimately result in accurate word pronunciations. There was a tendency for the learning disabled group to err more than control subjects. These results reinforced the need to test each specific reading behavior in light of its proportion to the total miscues in addition to the test of raw number. Further, the tendency for the learning disabled to have more errors led to further exploration of salient reading behaviors by error level.

In regard to meaning change, there were strong main effects for group and for district in both number and proportion of these errors. The data of Table 2 show not only these effects but the reason for the tendency for the interaction effect on number of meaning change errors. That is, while both groups of District A had higher <u>proportions</u> of meaning change errors than

- Table 2 here -

their counterparts in District B, in the test for <u>number</u>, the control subjects from District A were very like the control subjects in District B.

Since the learning disabled subjects miscued more and tended to err more than the control subjects, analyses were conducted to examine meaning change error patterns according to extent of error rate to find if error rate differences accounted for differences in meaning change. Using the functional reading level designations -- frustration level, instructional level, and independent level -- common to classroom instruction, subjects were divided by group into level according to error rate, with results shown in Table 3. Overall, more of the

- Table 3 here -

learning disabled subjects read the story at their frustration level than control subjects did; more of the control subjects read at their instructional level than learning disabled subjects did; further, no learning disabled subjects read at their independent level. As is clear, variation was considerable despite the three step standard procedure to control for error. In regard to the difference in meaning change errors by group, all four comparisons that were possible resulted in significant t test differences. That is, learning disabled subjects had difficulty maintaining sentence context when reading at both frustration and instructional levels and when considering both number of these errors and their proportion to subject total miscues.

Self-correction behavior was measured in a number of ways. First, there was a group main effect for number of self-corrections; learning disabled subjects made more, not fewer as predicted, self-corrections (LD, $\bar{x}$=6.916, sd=3.804; C, $\bar{x}$=4.721, sd=2.938). This explains some of the higher miscue rate among the learning disabled, but since the proportional test resulted in no significant effects, their self-correction cannot be considered different in view of their total reading strategy.

In fact, the learning disabled subjects were poorer self-correctors, when the results of two measures of self-correction of meaning change errors

were considered. Based on the notion that extensive self-correction specifically of meaning change errors would demonstrate effective use of self-correction, two tests of this behavior were made. The first measured subjects' self-correction of all meaning change errors; a group effect resulted. The second test, which also produced a group effect, measured the self-correction of those errors that were meaning change and which also resulted in ungrammatical sentences or self-correction of severe meaning change errors. Table 4 data demonstrate that the learning disabled subjects were not as effective self-correctors as control subjects.

- Table 4 here -

However, in all analyses of self-correction, high standard deviations indicated very idiosyncratic use of this strategy. Yet, self-correction of meaning change errors was significantly negatively correlated with miscue rate ($r = -.407$, $p < .01$), meaning change errors ($r = -.499$, $p < .01$), and proportion of meaning change errors ($r = -.717$, $p < .01$). Thus, although high self-correction was related to effective reading strategies (low miscue, low meaning change errors), not all good readers used this particular strategy.

As before, the self-correction of meaning change errors was analyzed further in terms of group performance at the three functional reading levels to find if error rate accounted for the self-correction behavior. Table 5 presents the results; there was a significant difference only at the instructional level and only with severe meaning change errors. Learning disabled subjects were less efficient

- Table 5 here -

than control subjects in self-correcting these severe errors, but they were no different in self-correcting severe errors at frustration level or in self-correcting all meaning change errors. Thus, while many of the group effects found in the analyses of variance were explainable by error rate, learning disabled subjects did differ in one important aspect of self-correction and at their instructional level.

Finally, multiple attempts to self-correct, as when a reader requires two or more attempts to self-correct before continuing to read, cannot be considered a salient distinguishing reading behavior. While there was a significant main effect for group and for district on these miscues, there was not confirmation of difference in the test for proportion.

Further, use of phonic cues did not differ by group or district. Again, although there were significant group effects for the number of miscues with high phonic cue use and for the number of miscues with high and partial phonic cue use, there were no significant effects for these kinds of miscues proportional to the total number of miscues made.

Generally, there were greater differences between learning disabled and control readers than between readers of District A and those of District B. That is, there were no main effects for district in the rate of miscue, the rate of error, in important self-correction indices, and in phonic cue use. However, not only did the subjects of District A make more meaning change errors demonstrating particular problems with context, as a group they read lower level story versions than subjects in District B. A t test of story level showed significant district differences: $t=4.381$, $df=77$, $p < .001$ with the subjects of District A reading lower level stories than those of District B.

This result is consonant with a long history of lower reading achievement by low socio-economic groups. What was also noteworthy, in respect to socio-economic groups, was the extent of the similarity in reading strategies of the two groups of readers in these two very different socio-economic groups.

Discussion

Learning disabled subjects were notable for their high rate of miscues and the tendency for them to err more than control subjects even though there was experimental control for error. Further, they made more meaning change errors, at both frustration level reading and at instructional level. They self-corrected as much, generally, but at the instructional level, they self-corrected the severe meaning change errors less than the control readers did. Finally, they used phonic cues as well as control readers, but not better, as predicted.

Overall, the learning disabled readers can be characterized as poorer users of context cues. It appears that learning disabled children need lessons in context. Specifically, these readers might profit from instruction to help them determine whether errors have changed sentence meaning or not; moreover, specific practice in lessons on self-correction on how to combine within-word cues with beyond-the-word cues to retain text meaning might be beneficial. However, the indications from this study are that these readers do not need additional phonics training. Important to future diagnosis, however, is inclusion of analysis of reading error types like those studied here to ensure that potential contextual problems are not being overlooked.

Potential causes of the discrepancies found in this study need consideration. While the evidence from studies of language functioning in the learning disabled predicted the problems with use of context, it is also important to consider a broader interpretation. Torgesen (1977) stated that findings of difference like these can be "...caused either by lack of ability related to a task or by failure to apply efficiently those abilities or capacities which are present." (p. 34) Given the fact that the learning disabled children in this study could self-correct, proportionally, as many of their errors as the control children, but differed only in the correction of severe meaning change errors, Torgesen's interpretation that learning disabled children may suffer from difficulties in adapting efficiently to tasks at hand is relevant. It may well be that learning disabled children are unable to effectively combine the processes required to self-correct (realization of an error, reanalysis of context, reanalysis of phonic cues, attempt at new word, judgment made on appropriateness) when meaning is marred. If inefficient learning strategies are the cause of the difficulties and are amenable to instruction, we may be able to help these poor readers.

Still another explanation is possible. It may be that teachers unwittingly depress disabled learners' reading acquisition. Allington (1978), for example, found that first grade teachers were more apt to refer to within-word cues when helping their poor readers pronounce a difficult word than to refer to beyond-the-word cues. With good readers, more beyond-the-word cues were used. Thus, teachers may be at least partly producing some of the inability to use context found in this study. Study of pupil behaviors and the teacher response to these behaviors during reading instruction may demonstrate if there are aspects of the interaction during reading to which teachers respond

and if some pupils use reading strategies which promote the teacher responses. Examination of post-correction reading may demonstrate that non-adaptive behavior by the learning disabled precipitates within-word cue preference.

Table 1. Analyses of variance effects

	Group		District		Interaction	
	F	p	F	p	F	p
Miscue rate	31.74	.000	-		-	
Error rate	3.48	.066 ns	-		-	
Meaning change errors						
Number	35.07	.000	3.91	.052	3.38	.07 ns
Proportion	9.11	.003	3.73	.057	-	
Self-correction miscues						
Number	7.22	.009	-		-	
Proportion	-		-		-	
Of meaning change errors	5.63	.020	-		-	
Of severe meaning change errors	10.12	.002	-		-	
Number multiple attempts to	6.94	.010	3.96	.050	-	
Proportion multiple attempts to	-		-		-	
Phonic cue use						
Number high use only	20.14	.000	-		-	
Proportion high use only	-		-		-	
Number high and partial	20.60	.000	-		-	
Proportion high and partial	-	-	-		-	

Table 2. Meaning change errors, group and district means.

		Learning Disabled		Control		Total
	District	A(22)[a]	B(14)	A(29)	B(13)	(79)
Number	$\bar{X}$	35.23	25.14	14.72	14.36	22.21
	sd	13.65	13.04	8.75	9.32	
Proportion	$\bar{X}$	62.85[b]	52.19	47.88	43.27	51.99
	sd	11.48	14.03	19.32	20.20	

[a] Number of subjects in parentheses

[b] Proportion of error to total miscues

Table 3. Meaning change errors by group and functional reading level.

		Frustration[a]		Instructional		Independent	
		LD(28)	C(13)	LD(8)	C(22)	LD(0)	C(8)
Number	$\bar{X}$	35.75	23.77	15.75	12.30	--	4.12
	sd	12.86	7.71	2.31	5.00		3.36
	t test		t=10.63 p < .001		t=4.42 p < .001		
Proportion	$\bar{X}$	60.10	55.35	53.76	45.59	--	34.00
	sd	14.17	12.29	9.47	15.49		31.22
	t test		t= 3.84 p < .001		t=5.30 p < .001		

[a] Error rates used to determine level: Frustration through 91%; Instructional, 92 through 96%; Independent, 97 through 100%.

Table 4. Percent self-correction of meaning change errors. Group means.

		Learning disabled(36)	Control(43)	Total(79)
Self-correction of all meaning change errors [a]	$\bar{X}$	12.42	20.84	15.865
	sd	9.45	19.94	
Self-correction of all severe meaning change errors [b]	$\bar{X}$	8.52	22.01	17.004
	sd	7.08	27.83	

[a] Meaning change errors self-corrected divided by all meaning change errors, self-corrected and not.

[b] Severe meaning change errors self-corrected (those that cause ungrammatical sentences as well as marring sentence meaning) divided by all severe meaning change errors, self-corrected and not.

Table 5. Percent self-correction of meaning change errors by group and functional reading level.

		Frustration		Instructional		Independent	
		LD(28)	C(13)	LD(8)	C(22)	LD(0)	C(8)
Self-correction of all meaning change errors	$\bar{X}$	9.93	9.40	21.17	19.00	--	44.46
	sd	7.11	4.56	11.79	10.35		33.73
	t test		t=.629 ns		t=1.576 ns		
Self-correction of severe meaning change errors	$\bar{X}$	7.77	7.46	11.15	23.46	--	41.66
	sd	6.59	5.16	8.55	25.92		41.79
	t test		t=.374 ns		t=8.202 $p < .001$		

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